

STATE OF MINNESOTA

IN SUPREME COURT

A17-0538

Court of Appeals

Anderson, J.

Mark Kedrowski,

Appellant,

vs.

Filed: September 11, 2019  
Office of Appellate Courts

Lycoming Engines,  
a division of AVCO Corporation,

Respondent.

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Eric J. Magnuson, Kelvin D. Collado, Robins Kaplan LLP, Minneapolis, Minnesota;

Thomas W. Fuller, Cortney S. LeNeave, Hunegs, LeNeave & Kvas, P.A., Wayzata, Minnesota; and

Stephen P. Watters, Watters Law Office, Minnetonka, Minnesota, for appellant.

Steven J. Wells, Timothy J. Droske, Andrew B. Brantingham, Dorsey & Whitney LLP, Minneapolis, Minnesota; and

Daniel A. Haws, John Paul J. Gatto, HKM, P.A., Saint Paul, Minnesota, for respondent.

Michael L. Weiner, Yaeger & Weiner, PLC, Minneapolis, Minnesota, for amicus curiae Minnesota Association for Justice.

## S Y L L A B U S

1. Because the district court abused its discretion by excluding the entire causation opinion of an expert witness when only one ground for the expert's causation opinion lacked foundational reliability, judgment as a matter of law was error.

2. The erroneous admission of the unreliable part of the expert's opinion warrants a new trial on liability.

Reversed and remanded.

## O P I N I O N

ANDERSON, Justice.

This litigation arises from the crash of a single-engine airplane, which resulted in serious injuries to appellant Mark Kedrowski, the pilot of the airplane. According to Kedrowski's expert, a defective fuel pump manufactured by respondent Lycoming Engines caused the airplane to lose power and crash. After the jury returned a \$27.7 million verdict for Kedrowski, the district court ruled that the opinion of Kedrowski's sole expert on causation lacked foundational reliability under Minn. R. Evid. 702 and that the expert's opinion should have been excluded in its entirety. Following the posttrial evidentiary ruling, the district court granted judgment as a matter of law to Lycoming, and the court of appeals affirmed. *Kedrowski v. Lycoming Engines*, No. A17-0538, 2018 WL 2293332, at \*1. (Minn. App. May 15, 2018). We hold that the district court's evidentiary exclusion was overbroad and an abuse of discretion and that a new trial on liability is required. We therefore reverse the decision of the court of appeals and remand to that court to decide the remaining issue on this appeal.

## FACTS

On September 3, 2010, Kedrowski crashed his single-engine airplane shortly after takeoff from the Lake Elmo Airport, sustaining serious injuries. Kedrowski told a first responder that “he lost power and was trying to get back to the airport” when the crash occurred. Kedrowski now has no memory of the accident or what happened to cause the airplane to crash.

Kedrowski brought an action against both Lycoming and Kelly Aerospace Power Systems, Inc., which manufactured the fuel pump of the airplane engine as part of a joint enterprise.<sup>1</sup> As relevant here, Kedrowski alleged that Lycoming manufactured the engine, including the fuel delivery system, “in a defective condition that was unreasonably dangerous to users and consumers.” Kedrowski alleged that, as a result, his airplane lost power and crashed and that he suffered severe personal injuries. Lycoming asserted a pilot-error defense in its answer.

Kedrowski retained expert Donald Sommer to investigate the crash. Sommer holds a degree in mechanical engineering and is a registered professional engineer. He is licensed by the Federal Aviation Administration as an airline transport and commercial pilot and has been authorized to instruct student pilots. He has over 16,000 hours of flight experience and specializes in aircraft accident reconstruction.

Sommer was of the opinion that the diaphragm-style Lycoming LW-15473 fuel pump in Kedrowski’s airplane had manufacturing defects and that those defects caused

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<sup>1</sup> Kelly was in bankruptcy and did not participate in the trial. Valters Aviation Service Station, Inc. was also named as a defendant but apparently settled with Kedrowski.

Kedrowski's power loss and crash. Sommer testified at trial that the pump was "incapable of providing for the needs of the engine" and that Kedrowski "lost the ability to continue the engine operation because of a defective fuel pump [and] that that fuel pump caused the engine to reduce itself in power . . . ." As Sommer summarized:

[A] fuel pump is the heart of an airplane. It works very much like a heart. It has valves, and the airplane depends on its function. When the heart goes into a reduced performance or when the heart starts leaking or when the heart has weak muscles, the problem is that the engine loses power. The airplane loses power. In a single-engine airplane, that means that the airplane is going to come down to the Earth, and that's what happened in this case.

Sommer reached this opinion after a multifaceted investigation. Sommer reconstructed Kedrowski's flight path, reviewed the airplane's maintenance history and operating manuals, reviewed Lycoming engineering documents, and analyzed the plane's propeller and engine components. Sommer also evaluated "human factors" and interviewed Kedrowski.

Two parts of Sommer's investigation corroborated Kedrowski's statement to the first responder that his airplane lost power before the crash. First, Sommer inspected the airplane's propeller, which had not been severely damaged in the accident sequence. According to Sommer, the propeller was "virtually pristine." Sommer testified that "you will never find a blade like this on an engine that's making power." Sommer testified that the propeller analysis showed that the engine was producing "low power at impact."

Second, Sommer testified that "the engine was pretty much in one piece" and had not "been completely damaged by the accident sequence," which allowed Sommer and his investigation team to install the engine on a dynamometer. As Sommer described, a

dynamometer “simulates an airplane” and “determine[s] how much horsepower” the engine is able to produce. Sommer testified that the engine was run on this device “to the maximum power that we could obtain.” The test showed Sommer that the horsepower output by the engine “was nowhere near what it was supposed to be.” Sommer testified that the loss of power was “significant”—“around 40 percent.” Although Sommer “strongly suspect[ed]” that the plane “would have enough [horsepower] to stay in the air,” the result of the dynamometer test disclosed that the engine was “not running right.”

To determine the cause of the power loss, Sommer “analyzed every part and component on the engine.” He tested the fuel servo, which “operated fine.” He also tested the engine’s two ignition systems, which “both worked, and they both ran the engine.”

Sommer learned something from his interview with Kedrowski that “really piqued” his interest in the fuel pump. Kedrowski told Sommer of occasions where he would engage a separate boost pump when starting the plane, “which is normal.” But when Kedrowski would turn off the boost pump, the engine would die. Sommer testified that these experiences were “significant” because they “mean[t] that the engine-driven pump has a problem”:

[I]f an engine will run only with the boost pump on and stops running when the boost pump is off and continued to run when the boost pump was turned back on, that’s pretty much . . . a no brainer to me that the engine-driven pump was not providing for the needs of the engine.

That the engine “quit when the boost pump was removed” revealed to Sommer that “the fuel pump had a history of not providing for the needs of the engine.” Sommer testified

that Kedrowski's boost-pump experiences showed that "the engine was not capable of running on that pump."

Sommer tested the pump on a flow bench. This testing became the focus of the parties' arguments on appeal. A flow bench is a "specialized test fixture" that is used to measure pump performance. A flow-bench test requires three parameters: the revolutions per minute (rpm) of the engine attached to the pump, the pounds per square inch (psi) of pressure output by the pump, and the pounds per hour (pph) of fuel flowing through the pump. These three parameters are interrelated, as Sommer testified:

[I]f you lower the flow coming out of the pump, in other words, you restrict it, you close down a valve, or in the case of an engine, the fuel injection system closes down. If you lower the flow, the pressure will go up. If you lower the pressure, the flow will go down. So they're interrelated, and you can control one through the other.

Sommer's investigation team "obtained some test parameters for the pump, flows and pressures," and "operated the pump close to those test parameters in order to determine whether or not it met the parameters." Sommer obtained the parameters from Aero Accessories, which Sommer described as "a shop that's approved to manufacture Lycoming fuel pumps." Sommer had an employee call an Aero Accessories employee, who provided specifications in an email.

In part, the Aero Accessories specifications stated that the pump should produce 271 pph of flow at 1800 rpm and 24 to 30 psi. Sommer's flow-bench test of the accident pump at those parameters showed that it produced only 48 pph of fuel flow at 1800 rpm and 25 psi. Sommer's flow-bench testing showed him that "the fuel pump wasn't coming anywhere near the specifications we received." Specifically, the pump "didn't make the

outlet pressure, and it didn't make the flow rate that we were given by Aero Accessories." Sommer testified that the flow-bench testing showed that the pump "had a problem" and "wasn't performing." Sommer opined that the pump "was not capable of producing design flow and pressure and that it was substandard."

Sommer later disassembled the pump. He testified that he "found some issues." When testing the pump's valve for air leaks, Sommer discovered "that we had potentially a very serious set of leaks in both the inlet and outlet check valves." Sommer also found that a "valve wasn't installed square in the hole" and that manufacturing problems "created a direct leakage path around the check valve for the inlet check valve."<sup>2</sup>

Sommer's investigation extended beyond the fuel pump. Sommer and his team "dis[as]sembled the engine completely, took it apart pretty much every nut and bolt and looked at all the stuff that you can look at on an engine." Sommer, despite having never worked on a diaphragm-style pump before, had performed "hundreds and hundreds, probably, close to a thousand" aircraft engine teardowns, and was "looking for anything that could explain [the] loss in horsepower." But the pistons, valves, cylinders, camshaft, crankshaft, connecting rods, and "all the internal components of the engine" appeared normal. Sommer testified that, "from the standpoint of the major mechanical components inside the engine, there was nothing there that was suspicious." Sommer believed that this

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<sup>2</sup> Sommer also found that a spring inside the pump "was weaker than what the [design] drawing called for and that because it failed to meet the Lycoming specifications of the drawing, it was in a defective condition."

elimination of all other sources of power loss—what Kedrowski refers to as a “differential analysis”—supported his conclusion that the Lycoming pump caused Kedrowski’s crash:

I went through everything in that engine that could possibly have made [the engine] lose power. The fuel system, the magneto system, the spark plugs, the fuel injection servo, the boost pump—every component that could possibly have caused this engine to fail was analyzed, and there was only one that was found with defects, and that’s the engine-driven fuel pump.

“[T]he only conclusion that makes sense, after almost four years of researching this,” Sommer testified, “is that the fuel pump caused the engine . . . to reduce itself in power.”

Additionally, Sommer tested the pump on a different airplane. After the fuel pump was installed, “they couldn’t get the airplane started.” Sommer testified that “the only thing different about this configuration was the accident fuel pump, and the engine wouldn’t start without an excessive amount of cranking. So something was wrong, and the only difference was the pump.”

Lycoming challenged Sommer’s opinion at every stage. In a motion in limine, Lycoming argued that Sommer should be precluded from offering an expert opinion because his report lacked reliability under Minn. R. Evid. 702. The district court reserved ruling on the admissibility of Sommer’s testing and stated that a ruling “will come at the time of trial based upon all of the evidence and foundation provided for each test on the record.”

At trial, Lycoming pressed Sommer on his selection of flow-bench-test parameters. Lycoming insisted that its design specifications for the pump should have been used. The design specifications identified two key sets of flow-bench-test parameters: a “minimum capacity test,” which called for the pump flow to be tested at 2 psi, and a “shut off pressure”



test, which indicated the specifications at which the pump should shut off flow completely—1800 rpm and 25 to 30 psi.

Sommer disavowed Lycoming's design specifications, testifying that "the pump design drawing specification pressures have no relation to running an engine."<sup>3</sup>

Someone who knows fuel pumps would know that no engine that's ever been built by any engine manufacturer with a fuel injection system will run on [2] psi. And if you're doing an accident investigation, it's folly to try to pick one data point out of the sky that has nothing to do with the engine and say: Here we go, let's run this spec.

According to Sommer, the engine required a minimum fuel pressure of 18 psi and a maximum of 26 psi. Sommer iterated that Lycoming's design specifications for the pump are "two data points which aren't relevant" to engine operation. Two psi "is a non-sequitur," Sommer testified, because it "doesn't help me determine why the engine ceased producing power." The shutoff specification was irrelevant because "shutoff means no fuel flow," but "[a]n engine cannot operate without fuel." Sommer explained that he did not test to Lycoming's design parameters, stating, "I'm an accident reconstructionist. I test the fuel pump to see if the fuel pump can cause an accident as it did in this case, and, therefore, I'm going to run the pump at parameters that are closer to what an engine seats." Sommer reiterated, "The 2 psi specifications did not matter because 2 psi does not run an

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<sup>3</sup> Sommer conceded on recross-examination that a pump was not defective if it met its design parameters. Lycoming asked Sommer, "If a fuel pump does meet the design specifications under which it is to be built, then it is not defective in its design nor manufacture, true?" Sommer replied, "A pump as designed and meets specifications, it's not defective. That's true." The jury's finding that the pump was defectively manufactured is not before us.

engine. The zero fuel flow specifications did not matter because you can't run an engine on zero fuel flow.”

The district court overruled Lycoming's foundation objection at trial, reasoning that “[i]t goes to weight.” After Kedrowski rested, Lycoming moved for judgment as a matter of law. *See* Minn. R. Civ. P. 50.01. Lycoming argued that Kedrowski did not test the pump “to see whether it can provide the fuel flows and fuel pressures that Mr. Sommer conceded would be appropriate for powering the engine.” Thus, Lycoming argued, “the plaintiffs have a complete lack of causation that precludes this case from going forward.”

Before ruling, the district court noted that the motion for judgment as a matter of law “is complicated and challenging.” “With regard to causation,” the court stated, it is a “very close question.” The court concluded that a jury “could reasonably infer that other possible causes of engine failure or loss of power due to the mechanical operation of the engine were ruled out” and that “the fuel pump did not meet specifications applicable to it.” The controversy over whether Sommer misunderstood the use of pump parameters was “subject to debate”—an “inconsistenc[y] . . . for the jury to resolve and . . . not for [the court] to resolve as a matter of law.” The court stated that “causation issues are generally matters of fact for the jury, and only in the clearest of cases does the question become one of law, and this is not so clear a case. In fact, it's a close case.”

The case was submitted to the jury. The jury returned a special verdict. Although the jury did not find that the Lycoming fuel pump was defective in design, it did find that the Lycoming pump was unreasonably dangerous because of a manufacturing defect and that the manufacturing defect was a direct cause of the injuries sustained by Kedrowski.

The jury also found that Lycoming was negligent in testing or inspecting the fuel pump; that the negligence was a direct cause of the injuries sustained by Kedrowski; that Kedrowski was not negligent with respect to his own safety; and that Lycoming was 55 percent at fault and Kelly Aerospace was 45 percent at fault. The jury found that a total of \$27.7 million in damages would reasonably and adequately compensate Kedrowski.

Lycoming renewed its motion for judgment as a matter of law. *See* Minn. R. Civ. P. 50.02. Lycoming also moved for a new trial on two issues: (1) liability under Minn. R. Civ. P. 59, arguing that Kedrowski’s trial counsel “repeatedly violated” pretrial evidentiary orders, and (2) damages, arguing that the verdict resulted from passion and prejudice.

On this occasion, in a thorough and exhaustive order, the district court granted Lycoming’s motion for judgment as a matter of law. Although the district court described the evidence as “more than adequate” to support the jury’s finding of a manufacturing defect, “[t]he mere existence of defects in the LW-15473 fuel pump does not prove that those defects caused plaintiff’s crash.” The court stated that Kedrowski needed “an admissible expert opinion that the subject fuel pump was, more likely than not, a substantial contributing factor in causing the crash.” *See Gross v. Victoria Station Farms, Inc.*, 578 N.W.2d 757, 762 (Minn. 1998) (“Expert opinion is required to prove causation if the issue is outside the realm of common knowledge.”). The court found that Sommer was the sole causation expert but that his opinion on causation lacked foundational reliability. Without Sommer’s causation opinion, Kedrowski’s claims against Lycoming failed, and Lycoming was entitled to judgment as a matter of law notwithstanding the jury’s verdict.

The district court also concluded “that the cumulative impact of plaintiff’s repeated violations” of pretrial evidentiary orders prejudiced Lycoming and required a new trial. The court therefore conditionally granted Lycoming a new trial on the issue of liability, *see* Minn. R. Civ. P. 50.03(a), but denied its motion for a new trial on the issue of damages.

Kedrowski appealed the grant of judgment as a matter of law to Lycoming. Lycoming cross-appealed, arguing that, as relevant here, in the event that the judgment as a matter of law in favor of Lycoming was reversed, a new trial should be granted on the issue of damages because the district court erroneously analyzed the damages award under Minn. R. Civ. P. 59.01(e) rather than Minn. R. Civ. P. 59.01(b). The court of appeals affirmed judgment as a matter of law for Lycoming without addressing Lycoming’s challenge to the denial of its motion for a new trial on damages. *See Kedrowski v. Lycoming Engines*, No. A17-0538, 2018 WL 2293332, at \*9 (Minn. App. May 15, 2018).

We granted Kedrowski’s petition for review.

## ANALYSIS

The issue we consider here is whether the grant of judgment as a matter of law to Lycoming was error, which requires that we review the district court’s posttrial exclusion of Sommer’s causation opinion. Because we conclude that the evidentiary ruling was an abuse of discretion and, consequently, that judgment as a matter of law was error, we also consider whether a new trial should be granted to Lycoming.

### I.

On review of the grant of a motion for judgment as a matter of law, we make an “independent determination” of the sufficiency of the evidence. *Jerry’s Enters., Inc. v.*

*Larkin, Hoffman, Daly & Lindgren, Ltd.*, 711 N.W.2d 811, 816 (Minn. 2006). Judgment as a matter of law “ ‘may be granted only when the evidence is so overwhelming on one side that reasonable minds cannot differ as to the proper outcome.’ ” *Lamb v. Jordan*, 333 N.W.2d 852, 855 (Minn. 1983) (quoting 4 Douglas McFarland & William J. Keppel, *Minnesota Civil Practice* § 2402 (1st ed. 1979)). “In applying this standard, (1) all the evidence, including that favoring the verdict, must be taken into account, (2) the evidence is to be viewed in the light most favorable to the verdict, and (3) the court may not weigh the evidence or judge the credibility of the witnesses.” *Id.* Our review is de novo. *Pouliot v. Fitzsimmons*, 582 N.W.2d 221, 224 (Minn. 1998).

A.

The standard for judgment as a matter of law requires that we take account of all of the evidence *Lamb*, 333 N.W.2d at 855. We first address whether a court may reconsider rulings on the admissibility of evidence when ruling on a posttrial motion for judgment as a matter of law.

Traditionally, we have said that evidentiary rulings made during trial are not to be revisited on a motion for judgment as a matter of law. *See Coble v. Lacey*, 90 N.W.2d 314, 322 (Minn. 1958) (stating that “judgment notwithstanding the verdict will never be granted for errors in either law or procedure committed at the trial”); *Eichler v. Equity Farms, Inc.*, 259 N.W. 545, 545 (Minn. 1935) (per curiam) (stating that in a motion for judgment notwithstanding the verdict, “[o]bjections cannot be raised . . . to rulings on the trial” (citation omitted) (internal quotation marks omitted)); *Bosch v. Chi., Milwaukee & St. Paul Ry. Co.*, 155 N.W. 202, 203 (Minn. 1915) (“[J]udgment notwithstanding the verdict will

never be granted for error in either law or procedure committed at the trial.”); *Nw. Marble & Tile Co. v. Williams*, 151 N.W. 419, 420 (Minn. 1915) (“Errors in the admission of evidence . . . present no ground for judgment notwithstanding the verdict.”).

More recently, we seem to have been less categorical about this concept. *See Reinhardt v. Colton*, 337 N.W.2d 88, 92 n.1 (Minn. 1983) (noting that the standard for judgment as a matter of law “suggests that the stage of the proceeding at which a motion for [judgment notwithstanding the verdict] is brought is an inappropriate time at which to effectuate a determination regarding the admissibility of evidence”); *Rochester Wood Specialties, Inc. v. Rions*, 176 N.W.2d 548, 552 (Minn. 1970) (agreeing with the district court that there was insufficient evidence of negligence at trial, while also stating that “[t]he expert opinions offered by plaintiff were not consistent and should not have been received”). *Reinhardt* and *Rochester Wood* neither referenced, nor repudiated, nor affirmed the *Nw. Marble* line of cases.<sup>4</sup>

Here, on the posttrial motion for judgment as a matter of law made by Lycoming, the district court—before considering the sufficiency of the evidence—first determined that Sommer’s causation opinion should have been excluded. Referencing *Coble*, amicus Minnesota Association for Justice posits that, in so doing, the district court erred. The parties rely on our more recent decisions: Kedrowski argues that the *Reinhardt* footnote

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<sup>4</sup> We have not adopted the federal rule, which is contrary to the *Nw. Marble* line of decisions. *See Weisgram v. Marley Co.*, 528 U.S. 440, 453–54 (2000) (“[I]n ruling on a motion for judgment as a matter of law, the court is to inquire whether there is any ‘legally sufficient evidentiary basis for a reasonable jury to find for [the opponent of the motion].’ Inadmissible evidence contributes nothing to a ‘legally sufficient evidentiary basis.’” (citations omitted)).

supports reversal, while Lycoming responds that *Rochester Wood* controls and dictates that we affirm the court of appeals.

We need not resolve the issue of which rule applies to the current dispute. Solely for the purpose of this appeal, we will assume without deciding that it was not error for the district court to revisit and reverse its prior evidentiary ruling when deciding the motion for judgment as a matter of law because, regardless of which line of cases controls, the district court's evidentiary ruling was itself erroneous.

#### B.

Kedrowski argues that the district court abused its discretion by excluding all of Sommer's causation opinion on foundational reliability grounds. We conclude that the district court did not abuse its discretion by finding that Sommer's flow-bench testing was foundationally unreliable but did abuse its discretion by excluding Sommer's entire causation opinion.

Expert opinion testimony "must have foundational reliability." Minn. R. Evid. 702. Foundational reliability is a concept that looks to the theories and methodologies used by an expert. *See Doe v. Archdiocese of St. Paul & Minneapolis*, 817 N.W.2d 150, 169 (Minn. 2012) (explaining that the "underlying reliability, consistency, and accuracy of the theory" of an expert lie at "the heart of the foundational reliability question"); *Goeb v. Tharaldson*, 615 N.W.2d 800, 816 (Minn. 2000) (requiring a proponent of scientific evidence to show that the "methodology used [by the expert] is reliable and in the particular instance produced reliable results"). When determining whether expert testimony has foundational reliability, a district court must consider both "the reliability of the underlying theory," as

well as “the reliability of the evidence in the particular case,” with a view toward the purpose for which the expert testimony is offered. *Doe*, 817 N.W.2d at 169.

Beyond theory and methodology, “expert familiarity with the facts of a case is an essential element of reliability.” Peter B. Knapp, *The Other Shoe Drops: Minnesota Rejects Daubert*, 27 Wm. Mitchell L. Rev. 997, 1015 (2000); cf. *Hudson v. Trillium Staffing*, 896 N.W.2d 536, 540 (Minn. 2017) (“It is well settled that expert opinions must have an adequate factual foundation to be admissible.”). When determining whether expert testimony has a reliable factual foundation, the question is whether “[t]he facts upon which an expert relies for an opinion [are] supported by the evidence.” *Gianotti v. Indep. Sch. Dist. 152*, 889 N.W.2d 796, 801–02 (Minn. 2017). The factual foundation of an expert’s opinion is inadequate if “(1) the opinion does not include the facts and/or data upon which the expert relied in forming the opinion, (2) it does not explain the basis for the opinion, or (3) the facts assumed by the expert in rendering an opinion are not supported by the evidence.” *Mattick v. Hy-Vee Foods Stores*, 898 N.W.2d 616, 621 (Minn. 2017) (citation omitted) (internal quotation marks omitted).

The district court gave three independent rationales for excluding Sommer’s causation opinion: (1) Sommer’s flow-bench testing, (2) Sommer’s failure to account for the fact that Kedrowski flew for over 300 hours before the crash, and (3) Sommer’s failure to account for his statement that Kedrowski’s plane could still fly with a 40-percent power loss. We address each in turn, reviewing for an abuse of discretion. *Doe*, 817 N.W.2d at 164.



1.

First, the district court found that Sommer conducted the flow-bench test “using an inherently unreliable methodology.” The court looked to Sommer’s testimony that his flow-bench testing showed him that the pump was unable to produce “design flow and pressure.” The court observed that Sommer used parameters obtained from a third-party parts vendor to conclude that the pump did not perform to specifications. But the district court found that those parameters came “from an unknown document that was later definitively proven not to be what Mr. Sommer assumed he needed to validate his theory”—they were neither Lycoming’s design parameters nor represented the fuel needs of Kedrowski’s engine. Because it was “apparent” to the court that the “scientific underpinnings” of Sommer’s causation opinion depended on the validity of his flow-bench testing, the court found that Sommer’s causation opinion should have been excluded.

We have little trouble affirming the district court’s detailed and thorough analysis finding that Sommer’s flow-bench testing lacked foundational reliability.<sup>5</sup> The record shows that Sommer could not consistently explain why he ran the flow-bench test as he did. Sommer first explained his opinion about the pump, derived from the flow-bench testing, specifically in terms of *design* parameters: “The flow bench testing showed me

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<sup>5</sup> Lycoming does not challenge the general theories that Sommer applied in his flow-bench testing. In other words, this case is not like *Doe*, when we relied on the concession of plaintiff’s repressed-memory-theory experts “that there was no way to tell whether a person was actually suffering from repressed memories in any given case” to affirm the district court’s exclusion of the expert opinion as foundationally unreliable. *See* 817 N.W.2d at 169.

that that pump was not capable of producing *design* flow and pressure and that it was substandard.” (Emphasis added.)

But when confronted with the parameters from Lycoming’s design drawing, Sommer changed course. Sommer was no longer concerned with the pump’s “design,” but rather with the pump’s effect on engine performance. “I’m not concerned with the design drawing specifications,” he testified. “I’m concerned with what the pump was capable of doing.” Testing to Lycoming parameters “is not something that we did in this case because that will not run an engine.” The 2 psi specification from Lycoming’s design drawing was, in Sommer’s words, not worth testing and was “a non-sequitur” because an engine could not run at that pressure. The engine required 18 psi.

Neither of Sommer’s explanations correspond to the parameters that Sommer actually employed in the testing process. Although Kedrowski does not concede that the parameters Sommer tested were meaningless, he does not argue that the parameters Sommer obtained in an email from a third-party parts vendor are Lycoming’s *design* parameters. The third-party parameters and the Lycoming parameters are different.

Moreover, nothing in the record shows that the third-party parameters were representative of the fuel needs of the engine in Kedrowski’s aircraft. This is evident for two reasons. First, Sommer tested parameters that would not run the engine. One of Sommer’s flow-bench parameters was 5 to 8 psi. By Sommer’s own logic, this parameter, like the 2 psi parameter from Lycoming’s design specifications, could not in any way relate to engine performance because the engine required fuel flow of 18 psi. In Sommer’s words, testing at a data point like 5 to 8 psi was “folly” because, at that level, the engine would

not run properly. Second, the other parameters Sommer tested were near the pump's *shutoff level* of 25 psi. The engine's flow requirement, 105 pph, should not be expected at the shutoff level. As Sommer put it, "shutoff means no fuel flow," but "[a]n engine cannot operate without fuel."

An expert should be able to explain test methodology consistently. If the expert cannot do so, the district court does not abuse its discretion by excluding evidence of that testing under Rule 702. *See Doe*, 817 N.W.2d at 169 (stating that the "underlying reliability, consistency, and accuracy" of the expert lie at "the heart of the foundational reliability question"). We therefore affirm the district court's conclusion that Sommer's flow-bench-testing methodology lacked foundational reliability.

2.

That said, because the district court's leap from this sound result to the conclusion that Sommer's entire causation opinion should be stricken is puzzling, we next address whether the court's exclusion was overbroad. Although district courts have wide discretion in ruling on expert opinion testimony, that discretion must be "exercised favorably to any honest course capable of eliciting relevant truth." *Lestico v. Kuehner*, 283 N.W. 122, 126 (Minn. 1938). "Where a portion of the proffered expert testimony is reliable, wholesale exclusion can constitute an abuse of discretion." *Sorrels v. NCL (Bahamas) Ltd.*, 796 F.3d 1275, 1281 (11th Cir. 2015).

Here, the district court excluded Sommer's entire causation opinion because it was "apparent" that the "scientific underpinnings" of Sommer's opinion depended entirely on the validity of the flow-bench testing. But Sommer based his causation opinion on more

than the flow-bench testing. For example, he testified that his opinion was also grounded on his differential analysis—the complete disassembly of the engine, down to its nuts and bolts, pistons, valves, cylinders, camshaft, crankshaft, and connecting rods—which found no explanation for the loss of power that Kedrowski described to the first responder except the defective pump. To Sommer, therefore, “the only conclusion that makes sense, after almost four years of researching this, is that the fuel pump caused the engine . . . to reduce itself in power.” As the district court originally reasoned, based on the differential analysis, a jury reasonably could infer that “other possible causes of engine failure or loss of power due to the mechanical operation of the engine were ruled out.” It would not be unreasonable for the jury then to conclude that the pump—the only engine component that Sommer found to be defective—caused the loss of power that Kedrowski told the first responder about and that Sommer confirmed with his propeller analysis and dynamometer testing. And, as Sommer testified, when a single-engine airplane loses power, “that means that the airplane is going to come down to the Earth . . . .”

In addition to the differential analysis, Sommer also grounded his opinion on Kedrowski’s personal experiences with the boost pump. Kedrowski told Sommer about several occasions where his engine would quit when he turned off the boost pump. To Sommer, these experiences indicated that “the fuel pump ha[d] a history of not providing for the needs of the engine.” Kedrowski’s boost-pump experiences showed Sommer that “the engine was not capable of running on that pump.” Sommer, whose expertise on the subject matter is not in dispute, testified that this conclusion was “a no brainer.”

Because Sommer’s opinion was grounded on more than one basis, it is comparable to the expert’s opinion in *Sentinel Management*, where an expert sampled five units out of a 450-unit apartment building and found that four samples tested positive for asbestos. 615 N.W.2d 819, 822–23 (Minn. 2000). The expert extrapolated from these four samples, opining that the entire building was contaminated. *See id.* On appeal, we agreed with the district court that the challenge to the reliability of the expert’s extrapolation “went to the weight, rather than to the admissibility of his testimony,” in part because the expert’s opinion “was based on much more than the four positive dust samples.” *Id.* We were persuaded by the fact that the expert’s opinion was also based on an inspection of the property and interviews with building managers. *See id.* at 824–25. So too here. Along with the flow-bench testing, Sommer’s causation opinion was grounded on a detailed analysis of the crash and the engine, as well as a pilot interview, which permitted Sommer to rule out all other causes of power loss.

We are not persuaded by Lycoming’s argument that Sommer’s differential analysis is similar to the differential diagnoses excluded in *Goeb v. Tharaldson*, 615 N.W.2d 800, 815–16 (Minn. 2000). In *Goeb*, the plaintiffs offered the testimony of two doctors to prove that a chemical manufactured by one of the defendants had caused their illnesses. *See id.* at 805. The district court excluded the testimony of both doctors because it found that their methodology was unreliable. *See id.* at 803. We affirmed, relying in part on the fact that, although both doctors claimed that they conducted a differential diagnosis, neither had reviewed the postexposure medical records of the plaintiffs. *See id.* at 815–16.

Here, there are no similarly obvious deficiencies in Sommer’s differential analysis. Although Lycoming, citing the district court’s order, argues that “[i]t is undisputed that the subject engine had a plugged fuel injector nozzle at the time of the dynamometer test, which may have affected engine performance,” the pages of the transcript cited by the district court do not support this assertion. Indeed, at the pages cited, Lycoming’s expert was asked on cross-examination, “And you know that [the nozzle] was inspected and found according to Mr. Sommer . . . as *not being blocked*?” (Emphasis added.) In reply, Lycoming’s expert challenged Sommer’s conclusion, but did not claim that Sommer agreed with him that the nozzle was blocked. Nor does Lycoming cite testimony from Sommer that Sommer found that the nozzle was blocked. Rather, Sommer testified that he “analyzed every part and component on the engine,” and that after “every component that could possibly have caused this engine to fail was analyzed . . . there was only one that was found with defects, and that’s the engine-driven fuel pump.”

Lycoming also faults Sommer’s differential analysis because it does not quantify the impact of the pump’s defects on its fuel flow. But Lycoming cites no authority that all foundationally reliable expert causation testimony must be quantified. Although an opinion “clothed in the garb of mathematical accuracy,” *Storbakken v. Soderberg*, 75 N.W.2d 496, 501 (Minn. 1956), may be more persuasive, persuasiveness is not the sole measure of admissibility.

In sum, we cannot see how the deficiencies in Sommer’s flow-bench testing tainted Sommer’s investigation as a whole. Sommer’s differential analysis and interpretation of Kedrowski’s boost-pump experiences independently support his opinion that the defective

Lycoming pump caused Kedrowski's power loss and crash. Under these circumstances, we hold that the "wholesale exclusion" of Sommer's causation opinion was an abuse of discretion. *Sorrels*, 796 F.3d at 1281.

3.

We turn then to the district court's next rationale for excluding Sommer's causation opinion in its entirety. The court reasoned that Sommer's causation opinion should be excluded because "Sommer offered no scientific basis to explain how plaintiff's aircraft ever got off the ground once the subject fuel pump was installed much less explain how it could fly for 312 hours before suddenly crashing." The court described "the undisputed fact" (in apparent disregard of Sommer's interpretation of Kedrowski's boost-pump experiences) that the pump "supplied fuel to plaintiff's aircraft engine for 312 hours without any reported problems on take-off, during climb, or in the air." The court also relied on the absence of testimony that the pump's defects "interfere[d] with engine operation on a variable basis." The district court thus found that Sommer's causation opinion lacked "non-speculative foundational support."

Notably, the district court did not fault Sommer for his reliance on his differential analysis. The court did not find that Sommer's total teardown and inspection of the engine, which discovered no defective parts except the Lycoming pump, was merely "speculation or conjecture." *See Gianotti*, 889 N.W.2d at 802. Nor did the court state that Sommer's differential analysis lacked factual foundation for the other reasons described in *Mattick*, 898 N.W.2d at 621. Although the court called Sommer's interpretation of Kedrowski's boost-pump experiences "pure speculation" (because the court could identify other causes

for the engine quitting, “such as the fuel being too lean or too rich or air in the fuel lines”), a court is not entitled to dismiss an expert’s opinion on these grounds. *See Schulz v. Feigal*, 142 N.W.2d 84, 89 (Minn. 1966) (stating that plaintiffs are not required to “prove causation by direct and positive evidence which excludes every other possible hypothesis as to the cause”); *see also Lestico*, 283 N.W. at 126–27 (reversing a district court that had characterized an expert causation opinion as “pure speculation” because experts “have a broad experience far beyond the ordinary” and, “as to causation, they may sometimes come to worthwhile conclusions based upon the inherent evidence”).

Rather than addressing the actual grounds for Sommer’s opinion, the district court faulted it for its perceived factual gaps. Essentially, the court excluded Sommer’s opinion because of Sommer’s perceived failure to account for the fact that Kedrowski’s plane flew 312 hours before the crash. Kedrowski argues that this perceived gap in Sommer’s testimony is an issue for the jury because it goes to Sommer’s credibility, not his opinion’s admissibility. We agree.

“[A]lleged deficiencies in [an expert’s] factual basis go more to the weight of the expert’s opinion than to its admissibility.” *Bohach v. Thompson*, 239 N.W.2d 764, 767 (Minn. 1976); *see also LeMieux v. Bishop*, 209 N.W.2d 379, 385 (Minn. 1973) (“[A]ny error in calculations or in the assumption of facts or data upon which the opinion was based goes to the weight of the testimony, not to its admissibility.”). Although the district court’s observations may have some merit, and the evidence supporting Sommer’s claims is hardly overwhelming, Sommer’s testimony is properly the subject of a detailed cross-examination and argument to the jury, rather than a foundational-reliability determination under Rule



702. *Cf. Wenner v. Gulf Oil Corp.*, 264 N.W.2d 374, 382 (Minn. 1978) (stating that “any deficiencies” in an expert’s testimony “could have been brought out by defendant on cross-examination”).

In concluding that Sommer’s alleged failure to account for the fact that Kedrowski flew 312 hours before the crash is a question of weight, not of foundational reliability, we are mindful of “the line of distinction which separates the legitimate province of the [judge] from that of the [jury],” *Hicks v. Stone*, 13 Minn. 434, 437 (1868), which is that “the role of resolving disputed facts belongs to the jury, not the court,” *Leiendecker v. Asian Women United of Minn.*, 895 N.W.2d 623, 635 (Minn. 2017); *see also In re Sperl’s Estate*, 103 N.W. 502, 505 (Minn. 1905) (“ ‘The cardinal maxim of our law, “Ad questiones facti non respondent iudices,” is not to be lightly violated. Every attempt to do so simply introduces confusion and uncertainty.’ ” (citation omitted)); 1 Edward Coke, *The First Part of the Institutes of the Laws of England, or, a Commentary upon Littleton 155b* (Francis Hargrave et al., eds., 1st Am. ed. 1812) (“ad questionem facti non respondent iudices,” the principle that judges do not answer facts when a jury can do so). We hold that the district court abused its discretion by excluding Sommer’s causation opinion based on a lack of factual foundation when the opinion also presented nonspeculative grounds, including Sommer’s differential analysis and interpretation of past failures of the pump.

4.

The district court’s last rationale fails for similar reasons. The district court noted that Sommer’s “dynamometer testing established ‘around’ a 40% horsepower loss.” A 40-percent horsepower loss meant that the engine would operate with about

120 horsepower; however, Sommer testified that he “strongly suspect[ed] [120 horsepower] would have been enough to stay in the air.” Because “Sommer conceded that plaintiff’s airplane was capable of flight despite the existence of defects in the fuel pump,” the district court found that “he lacked a scientific and foundational basis to testify that fuel pump defects caused the airplane to crash.” Sommer’s causation opinion was therefore “entirely speculative.”

The fact that Kedrowski’s airplane could remain aloft with the 40-percent power loss that Sommer attributed to the defective fuel pump is not itself fatal to Kedrowski’s case. *See Osborne v. Twin Town Bowl, Inc.*, 749 N.W.2d 367, 372 (Minn. 2008) (explaining that Minnesota recognizes substantial-factor causation rather than but-for causation). Sommer’s alleged failure to reconcile his general statement that the plane was capable of flight with his specific causation opinion, which was based on his differential analysis and interpretation of Kedrowski’s past failures of the pump, also goes to weight rather than admissibility, for the reasons set out earlier. We therefore hold that the exclusion of Sommer’s causation opinion on this basis also was an abuse of discretion.

### C.

In sum, we conclude that the flaws in Sommer’s flow-bench testing are not sufficient to exclude Sommer’s ultimate opinion on causation. From Sommer’s testimony as a whole, even without referencing the flow-bench testing, the jury could draw the inference that the loss of aircraft power was the result of the (undisputed) manufacturing defects present in the Lycoming pump and a substantial factor in the airplane crash and Kedrowski’s resulting injuries. Moreover, the flaws that the district court found in the

factual foundation of Sommer’s opinion were questions of weight and credibility for the jury to resolve. We therefore hold that the wholesale exclusion of Sommer’s causation opinion was an abuse of discretion.

Because we reverse the district court’s decision to exclude Sommer’s causation opinion, the evidence is no longer “ ‘so overwhelming on one side that reasonable minds cannot differ as to the proper outcome.’ ” *Lamb*, 333 N.W.2d at 855 (citation omitted). We therefore also reverse the judgment as a matter of law in favor of Lycoming.

## II.

Having concluded that the district court was within its discretion in finding that Sommer’s flow-bench testing was foundationally unreliable, we turn to whether the erroneous admission of that testing is grounds to grant Lycoming a new trial.

We may order a new trial when reversing judgment as a matter of law. Minn. R. Civ. P. 50.04 (“If the appellate court reverses the judgment, nothing in this rule precludes it from determining that the respondent is entitled to a new trial, or from directing the trial court to determine whether a new trial shall be granted.”). The erroneous admission of evidence may serve as a basis for the grant of a new trial. *See* Minn. R. Civ. P. 59.01(f); *W.G.O. ex rel. Guardian of A.W.O. v. Crandall*, 640 N.W.2d 344, 349 (Minn. 2002).

“Entitlement to a new trial on the grounds of improper evidentiary rulings rests upon the complaining party’s ability to demonstrate prejudicial error.” *City of Moorhead v. Red River Valley Co-op. Power Ass’n*, 830 N.W.2d 32, 39–40 (Minn. 2013) (citation omitted) (internal quotation marks omitted); *see also* Minn. R. Civ. P. 61; *George v. Estate of Baker*, 724 N.W.2d 1, 9 (Minn. 2006); *Crandall*, 640 N.W.2d at 349. “An evidentiary error is

prejudicial if it might reasonably have influenced the jury and changed the result of the trial.” *Estate of Baker*, 724 N.W.2d at 9. Evidence that would have “virtually no value in resolving the disputed fact questions” is not prejudicial. *Bisbee v. Ruppert*, 235 N.W.2d 364, 368 (Minn. 1975); *see also Poppenhagen v. Sornsin Constr. Co.*, 220 N.W.2d 281, 285 (Minn. 1974) (“[W]here excluded evidence is merely repetitious of other evidence admitted at trial, no prejudicial error results.”).

Here, Lycoming correctly asserts that Sommer’s flow-bench testing “was the only test that could quantify a shortfall in fuel flow.” Moreover, Kedrowski relies heavily on the flow-bench testing, asserting that it showed that the “accident fuel pump was incapable of providing sufficient fuel to meet the engine’s demands for takeoff and climb.” The only test that quantified the amount of fuel that the defective pump was capable of supplying to the engine—an issue central to this case—was not either “merely repetitious,” *Poppenhagen*, 220 N.W.2d at 285, or “irrelevant,” *Savings Bank of Kewanee, Ill. v. Schaal*, 195 N.W. 141, 142 (Minn. 1923). The admission of Sommer’s flow-bench testing “might reasonably have influenced the jury and changed the result of the trial,” *Estate of Baker*, 724 N.W.2d at 9, specifically on the issue of causation. Therefore, the admission of the flow-bench testing was prejudicial.

A new trial may be granted “on all or part of the issues.” Minn. R. Civ. P. 59.01. “All that is necessary for the application of this rule is that the issues should be so distinct and separable that one issue can be justly determined without a determination of the other.” *In re Buck’s Estate*, 142 N.W. 729, 733 (Minn. 1913). Because the flow-bench testing relates only to the liability of Lycoming, and liability is “distinct and separable” from the

issues of damages, we grant a new trial only on the issue of liability. *Cf. Crandall*, 640 N.W.2d at 350 (reversing and remanding for a new trial only on the issue of liability).

But there can be only one grant of a new trial on the issue of liability. Because we conclude that a new trial is necessary, Kedrowski's challenge to the district court's order that granted a new trial on liability based on prejudicial misconduct by Kedrowski's trial counsel, an issue that the court of appeals did not address, is moot. Therefore, on remand, the court of appeals need only address whether a new trial is warranted on the issue of damages. *Cf. Baker v. Baker*, 753 N.W.2d 644, 653 (Minn. 2008) (remanding to court of appeals to address unresolved arguments that were not before our court).

### **CONCLUSION**

For the foregoing reasons, we reverse the judgment granted as a matter of law in favor of Lycoming, order a new trial on the issue of liability, and remand to the court of appeals to address whether a new trial also is warranted on the issue of damages.

Reversed and remanded.